NONRESIDENT TRAINING COURSE

July 2001

Aviation Ordnanceman

NAVEDTRA 14313

Although the words "he," "him," and "his" are used sparingly in this course to enhance communication, they are not intended to be gender driven or to affront or discriminate against anyone.

PREFACE

By enrolling in this self-study course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program.

COURSE OVERVIEW: When you complete this course you will be familiar with bombs, fuzes, aircraft rockets and rocket launchers, air-launched guided missiles and guided missile launchers, pyrotechnics, air-laid mines and torpedoes, M61A1 gun installations, ammunition loading, and targets and associated equipment. You will also become familiar with ammunition handling equipment, suspension, arming, and releasing equipment, and ammunition handling and storage ashore and afloat.

Additionally, you will learn about aircraft weapons systems, weapons assembly, and aircraft loading and unloading procedures. You will also learn about aircraft weapons testing equipment and ammunition administration ashore and afloat.

THE COURSE: This self-study course is organized into subject matter areas, each containing learning objectives to help you determine what you should learn along with text and illustrations to help you understand the information. The subject matter reflects day-to-day requirements and experiences of personnel in the rating or skill area. It also reflects guidance provided by Enlisted Community Managers (ECMs) and other senior personnel, technical references, instructions, etc., and either the occupational or naval standards, which are listed in the *Manual of Navy Enlisted Manpower Personnel Classifications and Occupational Standards,* NAVPERS 18068.

THE QUESTIONS: The questions that appear in this course are designed to help you understand the material in the text.

VALUE: In completing this course, you will improve your military and professional knowledge. Importantly, it can also help you study for the Navy-wide advancement in rate examination. If you are studying and discover a reference in the text to another publication for further information, look it up.

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Sailor's Creed

"I am a United States Sailor.

I will support and defend the Constitution of the United States of America and I will obey the orders of those appointed over me.

I represent the fighting spirit of the Navy and those who have gone before me to defend freedom and democracy around the world.

I proudly serve my country's Navy combat team with honor, courage and commitment.

I am committed to excellence and the fair treatment of all."

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INSTRUCTIONS FOR TAKING THE COURSE

ASSIGNMENTS

The text pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions. Pay close attention to tables and illustrations and read the learning objectives. The learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

SELECTING YOUR ANSWERS

Read each question carefully, then select the BEST answer. You may refer freely to the text. The answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the course.

SUBMITTING YOUR ASSIGNMENTS

To have your assignments graded, you must be enrolled in the course with the Nonresident Training Course Administration Branch at the Naval Education and Training Professional Development and Technology Center (NETPDTC). Following enrollment, there are two ways of having your assignments graded: (1) use the Internet to submit your assignments as you complete them, or (2) send all the assignments at one time by mail to NETPDTC.

Grading on the Internet: Advantages to Internet grading are:

- you may submit your answers as soon as you complete an assignment, and
- you get your results faster; usually by the next working day (approximately 24 hours).

In addition to receiving grade results for each assignment, you will receive course completion confirmation once you have completed all the assignments. To submit your assignment answers via the Internet, go to:

http://courses.cnet.navy.mil

Grading by Mail: When you submit answer sheets by mail, send all of your assignments at one time. Do NOT submit individual answer sheets for grading. Mail all of your assignments in an envelope, which you either provide yourself or obtain from your nearest Educational Services Officer (ESO). Submit answer sheets to:

COMMANDING OFFICER
NETPDTC N331
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32559-5000

Answer Sheets: All courses include one "scannable" answer sheet for each assignment. These answer sheets are preprinted with your SSN, name, assignment number, and course number. Explanations for completing the answer sheets are on the answer sheet.

Do not use answer sheet reproductions: Use only the original answer sheets that we provide—reproductions will not work with our scanning equipment and cannot be processed.

Follow the instructions for marking your answers on the answer sheet. Be sure that blocks 1, 2, and 3 are filled in correctly. This information is necessary for your course to be properly processed and for you to receive credit for your work.

COMPLETION TIME

Courses must be completed within 12 months from the date of enrollment. This includes time required to resubmit failed assignments.

PASS/FAIL ASSIGNMENT PROCEDURES

If your overall course score is 3.2 or higher, you will pass the course and will not be required to resubmit assignments. Once your assignments have been graded you will receive course completion confirmation.

If you receive less than a 3.2 on any assignment and your overall course score is below 3.2, you will be given the opportunity to resubmit failed assignments. **You may resubmit failed assignments only once.** Internet students will receive notification when they have failed an assignment—they may then resubmit failed assignments on the web site. Internet students may view and print results for failed assignments from the web site. Students who submit by mail will receive a failing result letter and a new answer sheet for resubmission of each failed assignment.

COMPLETION CONFIRMATION

After successfully completing this course, you will receive a letter of completion.

ERRATA

Errata are used to correct minor errors or delete obsolete information in a course. Errata may also be used to provide instructions to the student. If a course has an errata, it will be included as the first page(s) after the front cover. Errata for all courses can be accessed and viewed/downloaded at:

http://www.advancement.cnet.navy.mil

STUDENT FEEDBACK QUESTIONS

We value your suggestions, questions, and criticisms on our courses. If you would like to communicate with us regarding this course, we encourage you, if possible, to use e-mail. If you write or fax, please use a copy of the Student Comment form that follows this page.

For subject matter questions:

E-mail: n315.products@cnet.navy.mil
Phone: Comm: (850) 452-1001, ext. 1717
DSN: 922-1001, ext. 1717
FAX: (850) 452-1370
(Do not fax answer sheets.)
Address: COMMANDING OFFICER
NETPDTC N315
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32509-5237

For enrollment, shipping, grading, or completion letter questions

E-mail: fleetservices@cnet.navy.mil
Phone: Toll Free: 877-264-8583
Comm: (850) 452-1511/1181/1859
DSN: 922-1511/1181/1859
FAX: (850) 452-1370
(Do not fax answer sheets.)
Address: COMMANDING OFFICER
NETPDTC (CODE N331)
6490 SAUFLEY FIELD ROAD
PENSACOLA FL 32559-5000

NAVAL RESERVE RETIREMENT CREDIT

If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For Naval Reserve retirement, this course is evaluated at 21 points which will be credited in units as follows: Unit 1: 12 points upon completion of assignments 1 through 8 and Unit 2: 9 points upon completion of assignments 9 through 14. (Refer to *Administrative Procedures for Naval Reservists on Inactive Duty,* BUPERSINST 1001.39, for more information about retirement points.)

Student Comments

Course Title: *Aviation Ordnanceman*

NAVEDTRA: *14313* **Date**: _____

We need some information about you:

Rate/Rank and Name: _____ SSN: _____ Command/Unit _____

Street Address: _____ City: _____ State/FPO: _____ Zip _____

Your comments, suggestions, etc.:

Privacy Act Statement: Under authority of Title 5, USC 301, information regarding your military status is requested in processing your comments and in preparing a reply. This information will not be divulged without written authorization to anyone other than those within DOD for official use in determining performance.

NETPDTC 1550/41 (Rev 4-00)

CHAPTER 1

BOMBS, FUZES, AND ASSOCIATED COMPONENTS

Bombs must be manufactured to withstand reasonable heat and be insensitive to the shock of ordinary handling. They must also be capable of being dropped from an aircraft in a safe condition when in-flight emergencies occur.

Bomb detonation is controlled by the action of a fuze. A fuze is a device that causes the detonation of an explosive charge at the proper time after certain conditions are met. A bomb fuze is a mechanical or an electrical device. It has the sensitive explosive elements (the primer and detonator) and the necessary mechanical/electrical action to detonate the main burster charge. A mechanical action or an electrical impulse, which causes the detonator to explode, fires the primer. The primer-detonator explosion is relayed to the main charge by a booster charge. This completes the explosive train.

FUZE TERMINOLOGY AND BASIC FUZE THEORY

LEARNING OBJECTIVE: *Describe the operation of mechanical and electrical fuzes. Identify special safety features that are inherent in bomb fuzes.*

This chapter will introduce you to some of the common terms and acronyms associated with fuzes used in the Navy. Basic fuze theory, general classes of fuzes, and the various types of fuzes are also discussed in this chapter.

FUZE TERMINOLOGY

Some of the most common fuze terms that you should know are defined as follows:

Arming time. The amount of time or vane revolutions needed for the firing train to be aligned after the bomb is released or from time of release until the bomb is fully armed. It is also known as *safe separation time (SST).*

Delay. When the functioning time of a fuze is longer than 0.0005 second.

External evidence of arming (EEA). A means by which a fuze is physically determined to be in a safe or armed condition.

Functioning time. The time required for a fuze to detonate after impact or a preset time.

Instantaneous. When the functioning time of a fuze is 0.0003 second or less.

Nondelay. When the functioning time of a fuze is 0.0003 to 0.0005 second.

Proximity (VT). The action that causes a fuze to detonate before impact when any substantial object is detected at a predetermined distance from the fuze.

Safe air travel (SAT). The distance along the trajectory that a bomb travels from the releasing aircraft in an unarmed condition.

BASIC FUZE THEORY

Fuzes are normally divided into two general classes—mechanical and electrical. These classes only refer to the primary operating principles. They may be subdivided by their method of functioning or by the action that initiates the explosive train—impact, mechanical time, proximity, hydrostatic, or long delay. Another classification is their position in the bomb—nose, tail, side, or multi-positioned.

Mechanical Fuzes

In its simplest form, a mechanical fuze is like the hammer and primer used to fire a rifle or pistol. A mechanical force (in this case, the bomb impacting the target) drives a striker into a sensitive detonator. The detonator ignites a train of explosives, eventually firing the main or filler charge. A mechanical bomb fuze is more complicated than the simple hammer and primer. For safe, effective operation, any fuze (mechanical or electrical) must have the following design features:

- It must remain safe in stowage, while it is handled in normal movement, and during loading and downloading evolutions.
- It must remain safe while being carried aboard the aircraft.
- It must remain safe until the bomb is released and is well clear of the delivery aircraft (arming delay or safe separation period).